

Three Conceptions of Teacher Learning: Exploring the Relationship Between Knowledge and the Practice of Teaching

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Abstract: *This is the first in a series of articles addressing conceptions of teacher learning, and the implications of these conceptions for improving the practice of teaching. This article provides descriptions of three perspectives on teacher learning: knowledge-for-practice, knowledge-in-practice, and knowledge-of-practice (Cochran-Smith & Lytle, 1999). Examples of the application of each of these conceptions of teacher learning from the special education literature are provided. In subsequent articles, the implications of each of these perspectives are addressed relative to pre-service teacher education, professional development, research and the application of research to practice, and school change/improvement.*

For the last thirty years, extensive research has been conducted in special education to determine effective practices for addressing the needs of students with disabilities. This research has resulted in a range of interventions that have been documented as successful using experimental research methods. These effective practices have addressed a broad range of topics, including direct instruction (Carnine, Silbert, & Kameenui, 1997); teacher collaborative teams (Fuchs, Fuchs, & Bahr, 1990); reading instruction (Spear-Swerling & Sternberg, 1996); class-wide peer tutoring (Greenwood, Delquadri, & Hall, 1989); teaching strategies that accommodate diverse learners (Kameenui, Carnine, Dixon, Simmons, & Coyne, 2002); learning strategy interventions (Schumaker & Deshler, 1992); and cooperative learning strategies for teaching reading and mathematics (Slavin & Madden, 2001).

While there is general (although not unanimous) agreement among researchers regarding the effectiveness of these interven-

tions, the translation of this research to practice has been less than successful (Greenwood & Abbott, 2001; Fuchs, Fuchs, Harris, & Roberts, 1996; Gersten, Vaughn, Deshler, & Schiller, 1997; Gersten, Chard, & Baker, 2000). In fact, while some embrace these research findings, they have been ignored by others, and modified to suit the particular needs of still others (Gersten, Vaughn, Deshler, & Schiller, 1997). This has led to widespread concern regarding the extent to which research is being translated into practice in special education (Carnine, 1997; Gersten & Brengelman, 1996; Gersten, Vaughn, Deshler, & Schiller, 1997; Malouf & Schiller, 1995; Vaughn, Klingner, & Hughes, 2000).

Perhaps the clearest example of the failure to translate research into practice has been the lack of use of these practices, especially those related to reading instruction, in special education resource rooms (Vaughn, Moody, & Schumm, 1998). These settings were developed in response to concerns expressed regarding the effectiveness of self-contained spe-

cial education classrooms (Dunn, 1968). Resource classes were thus designed to provide students with disabilities with brief, intensive instruction in particular areas (most often reading and mathematics), while allowing students the opportunity to be included in general education classrooms with typical peers for most of the school day. While there are many research validated practices that could be used in these settings, evidence is clear that resource rooms have not lived up to their promise (Allington & McGill-Franzen, 1989; Englert, Mariage, Garmon, & Tarrant, 1998; Haynes & Jenkins, 1986; McGill-Franzen & Allington, 1991; Vaughn, Moody, & Schumm, 1998; Ysseldyke, O'Sullivan, Thurlow, & Christenson, 1989), as students in these classrooms often do not receive high quality, differentiated instruction based on evidence based practices.

Several researchers have speculated regarding why teachers have not readily translated research to practice (Fuchs et al., 1996; Gersten, Vaughn, Deshler, & Schiller, 1997; Vaughn, Klingner, & Hughes, 2000). Some have taken either a 'blame the teacher' or 'blame the researcher' perspective on this issue. For example, some blame researchers for failing to produce research-based practices that reflect the realities of classrooms (Vaughn, Klingner, & Hughes, 2000). Researchers are thus accused of developing interventions with little to no attention to the constraints placed on teachers' time, teacher beliefs and understandings regarding learning, or the culture of schools (Fuchs et al., 1996; Vaughn, Klingner, & Hughes, 2000). Others blame teachers, suggesting that some choose to ignore research-based methods, or use less effective methods because they are familiar with these methods (Fuchs et al., 1996; Vaughn, Klingner, & Hughes, 2000). Still others have suggested that the problem with translating research to practice may be traced back to the preparation of teachers (Greenwood & Maheady, 2001). These critics thus blame teacher educators, and suggest that pre-service preparation programs do not adequately provide future teachers with knowledge regarding effective practices and experiences where they learn to apply these practices (Greenwood & Maheady, 2001; Walsh, 2001).

Over the last several years, some re-

searchers have begun to recognize that the problem of translating research into practice is far more complex than simply blaming the researcher, blaming the teacher, or blaming the teacher educator. For example, Gersten, Chard, and Baker (2000) have suggested that at least six factors influence teachers' sustained use of research-based instructional practices. These factors are captured in the following questions.

1. Is there a deliberate plan to promote sustained use (e.g., training of trainers model, coaching, model lessons developed and videotaped)?
2. Are plans and expectations for change in teacher practice (i.e., observed teaching behavior) realistic?
3. Are teachers provided with opportunities to understand and think through the instructional approach and how it can be used for their students—including those with learning problems—and how it fits their local curriculum and standards?
4. Are systems to enhance teacher efficacy, such as peer networks and support, knowledgeable coaching, and joint examination of student data, in place?
5. Is there sufficient administrative support to promote sustained practice?
6. Is there an explicit attempt to link change with student performance data? (p. 457).

These questions provide a good beginning to understanding how teachers may better use research-based practices. They also address many critical issues such as linking research to improvements in student learning; ensuring that teachers have substantial interactions with colleagues as innovations are being implemented; and providing support for teachers as they address the technical and conceptual aspects of change (Gersten, Vaughn, Deshler, & Schiller, 1997). These investigators suggest that changes in the role of the researcher may be needed to better ensure the translation of research into practice. These changes could address the role of the researcher in schools, as they work as a collaborator and coach to generate knowledge with teachers; interpret school culture and dynamics; serve as an agent for school

change; and/or serve as a critic, bringing their unique perspectives, training, and skills to school improvement efforts (Gersten, Vaughn, Deshler, & Schiller, 1997). Finally, these investigators have suggested that research may be designed so that the resultant interventions are more likely to translate to practice if the interventions are concrete, practical, and specific; fit the day-to-day details of the classroom; and are sufficiently powerful to significantly improve student performance.

In a similar vein, Greenwood and Maheady (2001) suggest that there is much that teacher educators can do to ensure that pre-service teachers are well prepared to translate research-to-practice when they enter their own classrooms. For example, they suggest that pre-service teachers should learn what research is, what the purposes of basic and applied research are, how researchers and practitioners should communicate what they know, how to evaluate research, and how researchers and teachers can collaborate around evidence of student learning. To gain this information, Greenwood and Maheady suggest that pre-service programs should place a strong emphasis on research based practices and preparing students to understand and use research evidence in their practice.

While the research and reflections of researchers have added significant insight into the problems of translating research into practice, this problem is far from resolved. This series of articles seeks to add to this literature by providing an examination of these issues through the lens of teacher learning. These issues have been discussed previously, as the topics of teacher understanding, professional communities, and stages of teacher development have been addressed relative to sustaining research-based practices (Gersten, Chard, & Baker, 2000). However, what we provide is a more in depth examination of these issues by looking at teacher knowledge and practice, and how teacher learning activities may be structured to facilitate change in classroom practices.

The work of Cochran-Smith and Lytle (1999) provides the lens through which teacher learning will be examined in this series of articles. These researchers provide a framework for teacher learning based on the

relationship between what teachers 'know' and how this knowledge influences what they do. As Cochran-Smith and Lytle note, different conceptions of teacher learning result in very different ideas regarding how to improve teachers' effectiveness. The framework provided by these authors considers knowledge from three distinct perspectives, including "knowledge-for-practice"; "knowledge-in-practice"; and "knowledge-of-practice". Each of these conceptions will be subsequently described, followed by an example of teacher learning based on each of these perspectives taken from the special education literature.

Three Perspectives on Knowledge and Teacher Learning

Knowledge-for-Practice

Knowledge-for-practice is perhaps the most widely accepted perspective on teacher learning, notably so in special education. This perspective simply holds that the more teachers know about subject matter, instructional strategies, effective interventions, and so forth, the more effectively they will teach. This point of view thus leans heavily on formal knowledge or what are called 'best practices' or 'evidence based practices'. This suggests that there is a distinct knowledge base, consisting largely of research validated practices which may be made explicit and learned by teachers, who are then expected to use this information to guide practice (Cochran-Smith & Lytle, 1999). Teachers are thus consumers of knowledge that is largely produced by others, and generally are not seen as generators of knowledge.

For many years, this knowledge-for-practice perspective has been used as the foundation for one-shot 'teacher training' or workshop activities to disseminate knowledge and effective practices. Thus, an outside expert would present information on an effective practice to teachers, who were then expected to return to their classrooms and use this practice. We know from long experience that this approach to professional development has not proven effective (Bull & Buechler, 1997; Cochran-Smith & Lytle, 1999; Goodman, 1995; McLeskey & Waldron, 2000, 2002a; Sprinthall, Reiman, &

Thies-Sprinthall, 1996), as teachers seldom use practices, which are presented in such a manner. In recent years, research on professional development and teacher knowledge has revealed that teachers bring prior knowledge and experience to a learning situation, and this knowledge and experience provides the foundation for future learning (Sprinthall, Reiman, & Thies-Sprinthall, 1996). Thus, the new image of teacher learning and related professional development has moved to more of a constructivist model of instruction, and away from a transmission model. Furthermore, it has been widely recognized that teacher learning takes place over time with assistance and support from peers, and does not occur as a result of one-shot workshops (Cochran-Smith & Lytle, 1999).

Generally speaking, all three of the perspectives on knowledge and practice that are discussed herein share this conception of active teacher learning. However, as Cochran-Smith and Lytle (1999) point out, just below the surface, this new vision is translated into practice in very different ways. For example, the knowledge-for-practice perspective advocates might use an approach to professional development that employs some principles of constructivism, and actively engages teachers over time in learning. However, what teachers learn from this perspective remains information that is 'known' by researchers or other experts. Thus, there is a tension between the constructivist principles that might be used to deliver this information, and the prescribed nature of the information that is presented and to-be-learned.

Finally, the knowledge-for-practice conception of learning assumes that teachers play a central role in school change or improvement, as do the other conceptions of teacher knowledge. However, those who subscribe to this conception believe that the role of the teacher is played out through the learning of effective practices, and applying these practices in their classrooms. Thus, professional development related to this conception of teacher learning typically utilizes some form of what has come to be called 'best practice' relative to instruction, assessment, classroom management, and so forth. It is assumed that these best practices, which have been validated by research, are appli-

cable across any setting, and should be applied with fidelity to ensure the integrity of the innovation. The teacher's role is then to take this information and use it in her or his classroom to improve practice and student outcomes.

Knowledge-for-Practice: An Example from Practice

An example of the application of the knowledge-for-practice conception of teacher learning is provided by the work of Fuchs, Fuchs, Harris, and Roberts (1996). These investigators spent several years working with elementary and middle level teachers and other school professionals to develop and document the effectiveness of "Mainstream Assistance Teams" (MAT). These teams were designed to provide support to teachers who had students in their classrooms that were 'difficult to teach' (DTT). Teachers referred DTT students to the teams, and a school-based consultant who was trained by the researchers used a form of behavioral consultation to identify and analyze the problem, as well as to plan an intervention and related evaluation. As part of the behavioral consultation, teachers were provided with research-based interventions (behavioral contracts or other explicitly defined interventions) to use in their classrooms to address student difficulties.

The researchers who worked with teachers to develop and implement these teams brought a strong knowledge-for-practice conception of teacher learning to this endeavor. As previously noted, they felt that a 'known', research based process should be used by the MATs to solve problems (i.e., behavioral consultation), and that explicitly defined, research based interventions should be used once problems were identified. The researchers were experts in the use of this process and the identification of research based interventions, and provided training for teachers and other professionals who served as behavioral consultants in the schools.

Although the researchers entered these schools with preconceived notions regarding the nature of the research based problem solving process and interventions that they

desired to have teachers use, they worked over a three year period to adapt the process and interventions to ensure that they would meet teacher needs and be used over a sustained period of time after their departure. For example, at the end each of the first three years of the project, the researchers sought feedback from the teachers regarding the MAT process and interventions that were prescribed. Over this time, teachers noted that it was difficult to find a time for the team meetings, the behavioral consultation process was too time consuming, interventions took too much time and were too complex, and improvements in student academic and social behavior did not generalize.

In response to these concerns, the researchers developed written scripts to guide teacher interactions, as well as to focus meetings and limit the time demands on teachers. They also reduced the membership on the MAT to the referring teacher and one teacher or other school professional who served as a behavioral consultant, and provided consultants with a short list of empirically validated and detailed interventions from which they were to choose. In addition to these changes, the researchers systematically experimented with the efficacy of several aspects of the MAT, including a number of generalization strategies, student versus teacher-directed interventions, and interventions of shorter and longer duration.

The preceding description of MATs and the process used to develop and implement these teams over a three-year period indicates that the researchers made significant adaptations of the teams in an attempt to ensure that they fit into the local schools. They also provided on-site coaching to behavior consultants and teachers as interventions were being developed and implemented. As part of experimental studies that were conducted during the implementation of the MATs, the researchers demonstrated that the prescribed interventions were accurately used by teachers (ensuring treatment fidelity), and often resulted in improvements in students' academic or social behavior, although there was some question regarding the extent to which these improvements were maintained over time (Fuchs, Fuchs, Harris, & Roberts, 1996).

During the fourth year of this project, the researchers felt that the MATs had been well designed to 'fit' into the local schools and maintain their effectiveness. Their goal during this year was thus to train more behavioral consultants in local schools in the use of these methods, and to fade their presence from the settings, so that the teams were supported independently by the local school personnel. This was done during year four of the project, as the researchers withdrew from the schools, provided training for local behavior consultants, developed a comprehensive MAT handbook to support the local teams, and demonstrated that the local school personnel could successfully implement the MATs.

By the fifth year of this project, the researchers had trained 120 general educators and 30 special educators, school psychologists and guidance counselors in 34 elementary schools. They followed up these teams during the fifth year to determine the extent to which the MATs were being maintained after their departure, and "failed to find one instance of MAT use" (Fuchs et al., 1996, p. 261) in the 34 elementary schools. This occurred in spite of the previously described, significant efforts on the part of the researchers to 'fit' the intervention to the schools, gain ownership of the teams by teachers, provide teachers with the necessary supports to run the teams, and document the effectiveness of the MATs on student outcomes.

It should be noted that some researchers have found slightly greater sustainability for interventions that were more narrowly defined than MATs (e.g., a videodisk that was designed to teach fractions to students with disabilities (Gersten & Brengelman, 1996) was maintained by 2 of 7 teachers one year after the departure of the researchers). However, in general, the results of the Fuchs et al. (1996) investigation is typical of what many others have found in attempting to sustain the use of research based practices in schools, as these practices tend to wash out once researchers depart (Gersten, Vaughn, Deshler, & Schiller, 1997; Gersten & Brengelman, 1996).

MATs are primarily reflective of the knowledge-for-practice conception of teacher learning. While some components of active,

constructivist learning by teachers are incorporated into the development and implementation of the teams, MATs are built upon the foundation of a research-based approach to consultation, i.e., behavioral consultation. Furthermore, interventions that were used to address student problems were selected from a menu of interventions that are research based and provided by outside experts as 'known' effective or evidence-based practice. In the section that follows, a building based problem solving team based on the knowledge-in-practice conception of teacher learning is described. The development and approach used by these teams contrast sharply with the MATs.

Knowledge-in-Practice

A second conception of teacher learning, knowledge-in-practice, contrasts sharply with the previously described knowledge-for-practice, and diverges significantly from traditional practice in special education. This conception of teacher learning is similar to the conception of teaching as a craft (Grimmett & MacKinnon, 1992), with an emphasis on knowledge in action—that is, effective practice is what very good teachers know, and this knowledge is not formal knowledge that is 'out there' and readily available to all, but rather is embedded in the practice of good teachers (Cochran-Smith & Lytle, 1999). A fundamental assumption underlying this conception is that "teaching is, to a great extent, an uncertain and spontaneous craft, situated and constructed in response to the particularities of everyday life in schools and classrooms" (p. 262). Thus, teachers learn and become better teachers through experience, reflection on their practice, participation in collaborative teacher groups, inquiry into their experiences in the classroom, the study and discussion of cases, and the like.

The image of teacher learning that emerges from this conception differs sharply from the knowledge-for-practice conception of teacher learning. Knowledge-in-practice assumes that what teachers need to know is embedded in the practices of good, experienced teachers. Such teachers thus construct and solve problems out of the uncertainty

and complexity of their classrooms, building on knowledge from previous practice and other information from a variety of sources. This image of knowledge strongly suggests that there is a need for research paradigms that go well beyond the positivist paradigm, and further acknowledges that much of the research that has been produced using the positivist paradigm has little applicability in the classroom (Cochran-Smith & Lytle, 1999).

The approach to professional development that emerges from the knowledge-in-practice perspective on teacher learning contrasts the approach used by advocates of a knowledge-for-practice perspective. This conception of learning leads to professional development that is built upon the practice of good, experienced teachers, and focuses on practices that may be used by teachers to address student learning, motivation, behavior or other issues in the "crucible of action" (Grimmett, 1988, p. 13) within the classroom. Thus, in a sense, professional development is conceived as a form of inquiry, requiring teachers to examine their own practice and the practice of others. "This kind of learning sometimes occurs in dyadic situations (as in exchanges between an expert and a less experienced or less expert teacher) and sometimes in groups or communities (as in groups of experienced educators working together to reflect on, inquire about, and transform their experiences)" (Cochran-Smith & Lytle, 1999, p. 268). Furthermore, this perspective on professional development often focuses initially on teachers' examination of what they know and believe regarding classroom practice, reconsideration of this knowledge and beliefs, and examination and invention of ways of teaching that are consistent with their knowledge and beliefs (Cochran-Smith & Lytle, 1999).

This knowledge-in-practice conception of teacher learning assumes that teachers play a central role in school change or improvement. The major role of the teacher in this process is played out as teachers work in communities to reflect on and improve their practice. Such activities could lead a school in the direction of what Fullan (1993) has called learning organizations, as teachers and administrators frequently examine their prac-

tices, share this information with others, and seek input regarding ways to improve practice. These activities could also lead teachers and administrators to an examination of their beliefs and understandings regarding schooling and classroom practices, and subsequent examination of how classrooms and their school could be improved to better meet the needs of students, given the beliefs and understandings that have been identified (McLeskey & Waldron, 2000).

Knowledge-in-Practice: An Example from Practice

There are few examples of the knowledge-in-practice perspective on professional development in the special education literature (Chalfant & Pysh, 1979, 1989; Schumm & Vaughn, 1995; Waldron & McLeskey, 1992). Perhaps the most widely used method of professional development that fits this conception is the Teacher Assistance Team (TAT). These building based problem-solving teams are widely used across the U.S. (Kruger, Struzziero, Watts, & Vacca, 1995). Chalfant and Pysh (1979) developed the general design for these teams with the intention of providing teachers with a process for receiving assistance in addressing classroom problems from other experienced and well respected teachers in their school. A second purpose of these teams was to provide an alternative to the traditional, 'sage on the stage' form of professional development for teachers who participated on the teams. As they developed the framework for TATs, Chalfant and Pysh (1979) surveyed teachers regarding the type of assistance they wanted to help them better address student academic and behavioral problems in their classrooms. One teacher who acknowledges a need for assistance in her classroom, captured the perspective of many when she wrote with a red felt marker: "Whatever you decide to do. Please! NO MORE INSERVICE!!!" (p. 88). In response to this and other similar comments from teachers, Chalfant and Pysh developed an approach that teachers could use to address the craft of teaching, improving their practice by sharing information and collaboratively problem solving regarding problems teachers faced in classrooms.

In contrast to the previously described Mainstream Assistance Teams (Fuchs et al., 1996), TATs do not use predetermined, research-based interventions to address student problems. Rather, TATs are built on the belief that teachers in a given school have the knowledge and skills to solve most problems that arise in classrooms, but they need a method to share this information with others. TATs thus provide a process for teachers to refer problems they face to a team of experienced, well-respected teachers from their school. Once a referral is made, the team meets with the referring teacher to identify the particular problem that is to be addressed, brainstorm possible strategies for addressing the problem, work with the referring teacher to choose and clarify a method from among the brainstormed options to address the problem, and finally, set up a follow up meeting to determine if the intervention worked, or if further problem solving with the TAT is needed to address the identified problem or other problems.

TATs are thus built on several assumptions, including:

- Teachers in a school have the necessary knowledge and skills to solve most student academic and behavior problems that arise;
- Teachers can better address problems if they work together, rather than working in isolation;
- Teachers learn best through addressing problems in their own classroom or the classrooms of others, actively learning in a real world context.
- TATs should be tailored to the individual needs of the teachers in a given school, and not rely on a specific orientation to consultation (e.g., behavioral consultation);

To address these issues, teachers are selected by their peers to serve on the TATs. These teachers are subsequently provided training regarding the TAT process, addressing issues such as referral, problem identification, brainstorming, managing team meetings, and so forth. Although the TAT process is built upon the tenets of effective problem identification and problem solving, team members are encouraged to adapt the com-

ponents of the process to meet their own needs. Finally, it is recognized that teachers have very little time to give to work on the TATs during the school day. Thus, the TAT problem solving process is designed to be as efficient as possible, allowing teams to address a single referral, from problem identification to intervention, in approximately 30 minutes.

Several researchers have evaluated the effectiveness of TATs, primarily from the perspective of referring teachers. For example, Chalfant and Pysh (1989) provide data collected on 96 TATs from five descriptive studies across several states. These investigators found that $\frac{2}{3}$ of all referrals were provided assistance by the TATs that were satisfactory from the perspective of the referring teacher. According to these teachers, major strengths of the TATs were the effectiveness of the teams' group problem-solving and providing useful strategies; the support provided to teachers by team members; and the improvement of student performance and behavior.

Waldron and McLeskey (1992) provide further evidence supporting the effectiveness of TATs, as they describe the development of these teams in 120 schools as part of a grant funded by the Indiana Department of Education. These investigators used a process very similar to Chalfant and Pysh to develop the TATs, and also provided on-site support as the teams were being implemented. In surveys of teachers regarding the operation and outcomes of the TATs, Waldron and McLeskey obtained results very similar to those described by Chalfant and Pysh (1989). Referring teachers were generally satisfied with the support provided by the teams, and teachers who participated on the teams found that the problem solving process was efficient and effective. A final noteworthy finding by these investigators was that many of the TATs were sustained over time. Specifically, from 1 to 3 years after implementation of the teams and the departure of the investigators, 52% of the teams were still in operation.

Teacher Assistance Teams reflect the knowledge-in-practice conception of teacher learning. These teams are built upon a constructivist perspective on teacher learning, including only limited components that are

prescribed (i.e., the problem identification and solving process). Thus, there is limited tension between constructivist and mechanistic approaches to adult learning when these teams are used as a form of professional development. In the section that follows, an approach to school wide change based on the knowledge-of-practice conception of teacher learning is described. This example addresses change on a much broader scale than the previous examples of MATs and TATs.

Knowledge-of-Practice

A third conception of teacher learning, knowledge-of-practice, contrasts with the first two conceptions that have been presented. While emphasizing different aspects of knowledge, knowledge-for-practice and knowledge-in-practice draw a sharp distinction between formal knowledge and practical or craft knowledge. The knowledge-of-practice conception of teacher learning does not draw such a distinction (Cochran-Smith & Lytle, 1999). This perspective on teacher learning views all learning as constructed within a context, intimately connected to the knower, but also potentially relevant beyond the immediate situation. Knowledge may thus be used not only in the immediate classroom situation, but also to form conceptual frameworks that teachers use to make judgments. Furthermore, teachers play a central role in generating knowledge by "making their classrooms or schools sites for inquiry, connecting their own work in schools to larger issues, and taking a critical perspective on the theory and research of others" (Cochran-Smith & Lytle, 1999).

The image of teacher learning that emerges from the knowledge-of-practice conception is that local school and larger professional communities collectively construct knowledge. Knowledge thus results from the conjoined understandings of teachers and others who are committed to the long-term study of teaching and learning. Teachers' relationship to knowledge is much different in this conception of learning, in that this knowledge is used to not only improve the teacher's classroom practice, but also to transform the classroom and school to better

meet the needs of students (Cochran-Smith & Lytle, 1999).

Professional development from the knowledge-of-practice perspective is also quite different from previous conceptions. Professional development from this perspective focuses on teachers' learning by "challenging their own assumptions; identifying salient issues of practice; posing problems; studying their own students, classrooms, and schools; constructing and reconstructing curriculum; and taking on roles of leadership and activism in efforts to transform classrooms, schools, and societies" (Cochran-Smith & Lytle, 1999, p. 278). These professional communities often include both teachers and researchers, who bring quite different knowledge, skills, and perspectives to the enterprise. However, it is important to note that neither researchers nor teachers serve as 'experts', but rather, all involved are equal, fellow learners in the process.

The teacher's role in school change or improvement also contrasts sharply with the previous conceptions of teacher learning. From the knowledge-of-practice conception of teacher learning, teachers are central participants in school change, as they take on the role of change agents, critically analyze school practices, and collectively develop alternatives for school improvement. Indeed, the very goal of teacher learning and 'professional development' from the knowledge-of-practice perspective is "understanding, articulating, and ultimately altering practice and social relationships in order to bring about fundamental change in classrooms, school, districts, programs, and professional organizations" (Cochran-Smith & Lytle, 1999, p. 279). A central aspect of this process is teachers' commitment to student learning and life opportunities, and the transforming of any barriers (i.e., school policies and structures) that may limit student access to these opportunities.

Knowledge-of-Practice: An Example from Practice

An example of the application of the knowledge-of-practice conception of teacher learning to professional development from the special education literature is provided by

the work of McLeskey and Waldron (McLeskey & Waldron, 2000, 2002b; Waldron, McLeskey, & Pacchiano, 1999; Waldron & McLeskey, 1998). These university-based researchers have worked with approximately 35 teams of teachers from elementary and secondary schools over the last fourteen years on school improvement efforts to develop more inclusive schools and improve educational services for all students. These school improvement efforts begin with teams of teachers, administrators, and other professionals from a local school who volunteer to develop a plan for school improvement. These professionals work together as equals with outsiders (the university-based researchers) over the course of several months, with an ultimate goal of developing and implementing a comprehensive plan for school improvement, focusing on providing improved support for teachers as they meet the diverse needs of all students in general education classrooms.

Professional development activities begin with a discussion regarding the instruction that is provided students with disabilities and other students who are difficult to teach in the participants' schools, as well as in schools around the United States. Beliefs and understandings of participants regarding the needs of persons with disabilities, how these needs are addressed in schools, and social justice issues related to these practices are concurrently examined (Biklen, 1985; McLeskey & Waldron, 2000; Shapiro, 1993). This examination of student needs, school practices, teacher beliefs and understandings, and social justice issues provides a foundation for the school improvement effort that follows (Cochran-Smith & Lytle, 1999; Goodman, 1995; McLeskey & Waldron, 2000, 2002b).

Team members then begin to closely examine practices for addressing the academic and social needs of all students in their school, look at these practices in other schools, and consider effective practices from the professional literature. Several activities and school visits are also completed, including interviews with stakeholders from the local school community and a description of current practices in the local school. Team members then use this information to develop a tentative plan for school improvement,

addressing changes that are needed to improve instruction for all students, systemic issues that must be addressed to ensure that the plan is implemented, methods that will be used to ensure that key stakeholders support the plan, professional development that is needed by school professionals and other stakeholders, and so forth. (For a more complete description of this process, see McLeskey and Waldron, 2000).

As the plan for school improvement is being developed, teachers and other school professionals spend an appreciable amount of time discussing their current practices, and how these practices might be improved (knowledge-in-practice). In addition, they network with other teams who are working on the same activities to share ideas and perspectives. They also explore, along with the university researchers, evidence based practices from the professional literature that might be used in their school, and what the relative strengths and weaknesses of these practices are for their particular school (knowledge-for-practice). Thus, these teams of professionals work collaboratively, examine and challenge their assumptions regarding teaching and learning, and generate knowledge regarding how to improve their school to better meet the needs of all students.

Waldron and McLeskey (1998) examined the effectiveness of these school improvement efforts on the reading and mathematics achievement of students with mild disabilities in three inclusive elementary schools. Although these elementary schools developed unique school improvement plans based on their particular strengths, the school improvement plans shared several common elements across the three settings. These common elements included:

1. "Separate classes for students with learning disabilities and mild mental retardation were closed.
2. Teachers of students with disabilities worked collaboratively with two or more general education teachers.
3. Each student's program was built upon the general education program (e.g., curriculum), providing 'very good general education programs' and not at-

tempting to replicate special education in general education classrooms.

4. Attempts were made to avoid disproportionate numbers of students with disabilities, although students were at times clustered to simplify scheduling.
5. School organization was examined and changed to ensure that services of appropriate intensity could be provided.
6. Instructional assistants were used to support students with disabilities in general education classrooms." (p. 398).

An investigation of the impact of these schools on student achievement revealed that students with learning disabilities made significantly more progress in reading, and similar progress in math, when compared to students with learning disabilities who were educated in separate, resource room programs (Waldron & McLeskey, 1998). In addition, these researchers found that teachers' perspectives on these programs were very positive (McLeskey, Waldron, So, Swanson, & Loveland, 2001; Waldron, McLeskey, & Pachiano, 1999), as teachers felt that they benefited students with and without disabilities academically and socially. Furthermore, teachers felt that the professional development activities they experienced prior to beginning these programs had prepared them well for addressing student needs (McLeskey et al., 2001).

It is noteworthy that the changes that were made in these schools were often sustained over a number of years after the departure of the researchers (McLeskey & Waldron, 2002b). Indeed, the researchers rarely were involved in the initial implementation of these programs, as the local schools developed a plan for support during implementation, and often had a team of professionals from the local school that met frequently during the first year of implementation (and often beyond this time) to support the implementation of the planned program. Over the course of the twelve years these researchers have worked with schools using the previously described approach to professional development, they have worked with 35 schools. Approximately $\frac{1}{3}$ of these schools made significant changes in their curriculum, instruction,

and school organization (e.g., significant numbers of teachers involved in co-teaching, reorganizing the school day, significantly altering the curriculum). These schools maintained their programs for at least two years after the departure of the outside researchers. In $\frac{1}{3}$ of the additional schools, modest changes were made (e.g., some co-teaching, modifying curriculum to provide more student access, reorganizing classrooms using cooperative learning or peer tutoring), and these schools continued some level of program implementation for at least two years beyond initial implementation. More specifically, some of these schools continued to improve on the changes they initially made, and ultimately made significant changes in their programs, while others drifted over a period of years away from the programs that had been developed (McLeskey & Waldron, 2002b). Finally, in approximately $\frac{1}{3}$ of the schools that participated in these school improvement efforts, very few, mostly superficial changes occurred during the initial year of implementation. These findings are in keeping with Fullan (1993, 2001), who reports that schools which make or attempt significant changes are more likely to maintain at least some of the changes over a period of years.

Discussion

For several decades, researchers in special education have conducted high quality, empirical research that has resulted in well-documented effective practices for improving outcomes for students with disabilities. However, much evidence indicates that these interventions have not been widely used in schools (Carnine, 1997; Gersten, Vaughn, Deshler, & Schiller, 1997). Our current state of knowledge regarding teacher learning and the translation of research to practice is limited, but available evidence strongly suggests that the causes of this research to practice gap are complex and multifaceted. For example, the research to practice gap likely is influenced by how we prepare teachers in pre-service preparation programs, the type of professional development we provide teachers as they learn about evidence based innovations, the context in which these innovations are implemented, and the nature of the research that we con-

duct to explicate these practices. In the four articles that follow, each of these issues is addressed using the work of Cochran-Smith and Lytle (1999) as a lens through which teacher learning is examined.

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